Abstract of the Invention

An array of bottom-emitting VCSELs, with its substrate still intact, is tested by means of a probe that includes an optoelectronic array, which is aligned and coupled to the top surface of the VCSEL array. The probe is aligned to the VCSEL array just once. The optoelectronic array includes driver circuits for energizing the VCSELs and the photodetection circuits in a predetermined sequence for detecting the back emission that leaks through the top mirror of each VCSEL. In another embodiment, this probe and method are applied to testing bottom-emitting VCSELs one at a time. The VCSELs may discrete devices or part of an array. In accordance with another aspect of our invention, an array of bottom-emitting VCSELs, with its substrate still in intact, is tested by means of a probe that includes separate electronic and photodetection arrays. The probe is aligned to the VCSEL array just once. The electronic array, which is electrically coupled to the top surface of the VCSEL array, includes driver circuits for energizing the VCSELs. The photodetection array is aligned and coupled to the bottom of the substrate in order to detect the primary bottom emission of the energized VCSELs. The photodetection array is aligned so that each detector receives the emission from a particular VCSEL, but because the substrate is relatively thick, the divergence of the bottom emission produces cross-talk; that is, the bottom emission of one VCSEL may be received by an adjacent photodetector that is supposed to detect only the emission from another VCSEL. To alleviate this cross-talk problem, the VCSELs are energized in a first predetermined sequence and/or the photodetector circuitry is turned on in a second predetermined sequence.